공통규격서 Commodity Description

▶ 입찰서는 최소한의 기준사양을 알려드리오니 기준사양에 적합하거나, 그 이상의 규격을 가진 제품을 제시하여 주시기 바랍니다.

분류번호	등급	명칭	수량	단위
A13020.01	3	치료용 하전입자 가속장치 **(Linear Accelerator System_Bore type)**	1	System

A. Features :

1) RF Power Source: High-efficiency Magnetron Source
2) Linear Accelerator type: O-ring Type (Bore Type) Linear Accelerator equipped with a Six Degrees-of-Freedom (6DoF) patient positioning couch
3) The treatment delivery system shall employ a fully integrated digital accelerator architecture designed for high reliability and workflow efficiency.
4) The treatment system shall provide a fully integrated workflow including treatment planning connectivity, image guidance, patient positioning verification, and treatment delivery through seamless integration with the existing Oncology Information System and Treatment Planning System.
5) Beam Specification 6 FFF, 800MU/min
6) Daily system test with Machine Performance Check(MPC) should perform Mechanical positional accuracy, Alignment with imaging system, Isocenter coincidence, Beam constancy

B. Specifications :

1. Main System

1) Beam Specifications (or equivalent)

- Photon beam energy (MV) : 6FFF
- Dmax (cm) : 1.3±0.2 (cm)
- Depth dose at 10 cm (%) : 63±1.0
- Plan Dynamic beam flatness (%) : ≤ ±2.9
- Symmetry (%) : ≤ 2.0
- Maximum dose rate at Dmax (MU/min) : 800
- Off-axis intensity (%) : 79.0 ± 2.0
- In-plane versus cross-plane penumbra (mm) : ≤ 1.0
- Maximum planned treatment size at isoplane (cm) : 28 x 38.5

2) Dosimetry Specifications (or equivalent)

- Dose output vs. Total MU requested: 1.0% or 1.0 MU whichever is greater
- Dose output constancy vs. gantry angle (%): ± 1.0
- Dose rate linearity: 1.0% or 1.0 MU whichever is greater
- Dose output accuracy (%): 1.0
- Arc Mode accuracry: 2.0% or 1.0 MU whichever is greater

3) Isocenter Specifications (or equivalent)

- Isocenter size (mm) : ≤ 0.90
- MV source radiation to mechanical coincidence (cm) : ± 0.10
- MV source to isocenter (cm) : 100

- kV source to isocenter (cm) : 100
- kV rotation center to siocenter coincidence (cm): ≤ 0.10
- Isocenter height relative to the floor (cm) : 110

3) Geometric Specifications (or equivalent)
- Gantry rotation range (degrees) : 211 (*Hypersight)
- Gantry rotation accuracy (degrees) : ±0.5
- Gantry rotation reproducibility (degrees) : ± 0.2
- Gantry maximum rotational speed during treatment delivery (RPM) : Up to 4.0
- Gantry maximum rotational speed during image acquisition (RPM): Up to 6.0
- Collimator rotation range (degrees) : ± 90
- Collimator rotation accuracy (degrees) : ± 0.5
- Collimator rotation reproducibility (degrees) : ± 0.3
- Collimator maximum rotation speed (RPM) : Up to 2.5
- Bore diameter (cm) : 100
- Laser coincidence (cm) : ± 0.1

4) Beam Shaping Specifications (or equivalent)
- Number of leaves : 114
- Leaf width resolution (cm) : 0.5 or 1.0
- Maximum field size (cm) : 28 x 28
- Maximum leaf extend position over centerline (cm) :14.0
- Maximum leaf retract position from centerline (cm) : 14.0
- Leaf overtravel (cm) : 14.0
- Single layer leaf transmission (%) : ≤ 0.75
- Dual layer leaf transmission (%) : ≤ 0.01
- Maximum leaf speed (cm/sec) : Up to 5.0
- Leaf end accuracy (cm) : ± 0.1
- Leaf end repeatability (cm) : ± 0.08 (distal), ± 0.09 (proximal)
- Leaf interdigitation (%) : 100%

5) PerfectKinetix Dynamic Couch Specifications (or equivalent)
- Weight limit with image-guided radiation therapy (IGRT) couch top (kg) : 280
- Couch top width (cm) : 53
- Couch top length (cm) : 200
- Couch top water equivalent thickness (cm) : 0.60 (thin), 0.93 (transition), 1.19 (medium)
- 6FFF attenuation (%) : 2.7 (thin), 4.1 (transition), 5.2 (medium)
- Small shift translational accuracy : ≤ 0.05 cm
- Small shift rotational accuracy: ≤ 0.25 deg
- Large translational shift accuracy: ≤ 0.1 cm
- Large translational shift rotational accuracy: ≤ 0.4 deg
- Longitudinal positioning accuracy (cm) : ≤ 0.1
- Degrees of freedom : 6
- Lateral travel range (cm) : ± 20.9
- Vertical travel range (cm) : -44.0 to 0

- Yaw rotation about isocenter (deg): ±3
- Roll rotation about isocenter (deg): ±3
- Lowest couch height above floor (cm): 66.0
- Deflection (cm) :≤ 0.5
- Notch distance (cm): 14.0

6) MV Imaging Specifications (or equivalent)

- Maximum planar imaging size: 28.0 x 28.0
- Source to imager distance (cm): 154
- Active Imaging area (cm): 43 x 43
- Fastest scan time (Sec): 12 or 14
- Gantry rotation acquisition scan range (degrees): 211 (*HyperSight)
- Image and treatment coincidence (cm): ≤ 0.1
- MV CBCT reconstructed volume length (cm): ≥ 25.0
- MV CBCT Scan diameter (cm): ≥ 25.0
- MV CBCT acquisition mode (pixels/degrees): 256 x 256 reconstruction matrix / 200
- MV CBCT Spatial linearity accuracy (cm): ±0.05
- MV CBCT slice thickness (cm): 0.2
- Viewable pixels (pixels): 1280 x 1280
- Maximum frame rate (frames/sec): 20
- MV CBCT reconstruction resolution: 1.08 mm x 1.08 mm x 2.0 mm voxel size
- Imager lag (%): 1.5
- Dose per MV/MV acquisition (MU): 2 or 4
- Dose per MV CBCT acquisition (MU): 5 or 10
- Automatic match accuracy (cm): 0.1
- Signal to noise ratio (dB): 49.5
- Hounsfield Unit Uniformity (HU): +/- 50
- Pixel pitch (cm): 0.028 x 0.112 (*Hypersight)
- Dynamic range (dB): 84

7) kV Imaging Specifications (or equivalent)

- Maximum scan diameter (cm) : 53.8 (*HyperSight)
- Source-to-imager distance (cm) : 154.
- Lateral offset of detector (cm) : 0.0 (*Hypersight)
- Spatial linearity accuracy (cm) : ± 0.05
- Image and treatment coincidence (cm) : ≤ 0.1
- Hounsfield unit uniformity (HU) : ± 40
- Pixel pitch (cm) : 0.028 x 0.112 (*Hypersight)
- Acquisition kV range (kV) :80 to 140
- Acquisition exposure time range (ms) : 10 to 25
- Automatic match accuracy (cm) : 0.1
- Customizable programs : Yes
- Anatomical programs : Yes

8) Imaging Solution Specifications (or equivalent)

- Active detector dimensions (cm): 86.0 x 43.0
- Fastest scan time (Sec): 5.9
- Gantry rotation acquisition scan range (degrees): 211
- Maximum reconstructed scan range for two datasets (cm): Up to 44
- Maximum scan diameter (cm): 53.8
- Extended diameter reconstruction (cm): 70.0
- Lateral offset of detector(cm): 0.0
- kV CBCT slice thickness(cm): 0.2
- Image and treatment coincidence (cm): ≤ 0.1
- Reconstruction methods: Standard (FDK), iCBCT, iCBCT Acuros, iCBCT MAR Adaptive

9) Technique Specifications (or equivalent)

- Image Guidance (IGRT) Imaging techniques
  - kV CBCT
  - MV CBCT or MV/MV
- Treatement Planning Techniques
  - Dynamically Flattened Beams
  - Field-in-Field
  - Intensity-Modulated Radiation Therapy (IMRT)
  - Intensity-Modulated Radiosurgery (IMRS)
  - Irregular Surface Compensator
  - Volume Modulated Arc Therapy (VMAT)
- Cone Beam Computed Tomography for Planning (CBCTp) Imaging techniques: KV CBCTP and Topograms

2. SGRT System

1) Number of camera/projector units	3 or more
2) Surface capture frame rate	≥5 frames per second or more
3) Measurement volume	Ellipsoid of 500 x 500 x 400 mm (Lat x Lng x Vrt) or equivalent
4) Supported Function (As of Bid Submission Date)	Automatic Beam Hold
5) Supported Treatment (As of Bid Submission Date)	Deep Inspiration Breath Hold (DIBH) or equivalent
6) Beam Hold Latency	< 400 ms or less
7) Configurable beam release time delay	0.5 – 3 s or equivalent

3. OIS / TPS (or equivalent)

1) OIS (Oncology Information System)
2) TPS (Treatment Planning System)
3) Workstation for TPS System
4) Monitor for TPS System (27")
5) GPU FAS (Frame Agent Server)
6) Treatment Planning License for Integrated VMAT/IMRT Planning
7) License for Knowledge-based Machine Learning Treatment Planning
8) License for Treatment Plan Check
9) License for Portal Dosimetry (Dose Calculation & Dosimetry Review)
8) License for Multi-Criteria Optimization (VMAT & IMRT)

4. CT-Simulator

1) Siemens go.Open pro (or equivalent)

5. Remote Access System - Citrix or Equivalent

1) License for 10 users

2) 5 Years Subscription Type or equivalent

C. Configurations :

1. O-ring (Bore) Type Linear Accelerator	1 Set
1) Main Body	1
2) 6 DoF (Degrees-of-Freedom) Couch	1
3) Advanced kV Imaging Solutions	1
4) Patient Motion Monitoring System	1
2. SGRT System	1 Set
1) 3-Camera SGRT System	1
2) Central Server for SGRT System	1
3) Handheld Devices (2)	1
4) Motion Management Interface for Auto-Beam Hold Function	1
3. OIS / TPS	
1) OIS (Oncology Information System)	2 Users
2) TPS (Treatment Planning System)	2 Users
3) Workstation for TPS System	2
4) Monitor for TPS System (27")	2
5) GPU FAS (Frame Agent Server)	2
6) Treatment Planning License for Integrated VMAT/IMRT Planning	2
7) License for Knowledge-based Machine Learning Treatment Planning	1
8) License for Treatment Plan Check	1
9) License for Portal Dosimetry (Dose Calculation & Dosimetry Review)	1
8) License for Multi-Criteria Optimization (VMAT & IMRT)	1
4. CT-Simulator	1 Set
1) 128 Channel / 384 slice reconstruction or more	1
2) 85cm Bore Size or more	1
3) 0.35sec rotation time or less	1
4) RGSC Realtime Interface	1
5) CT-sim Integrated Laser	1
6) Wireless Tablet workflow	1
7) Integrated Auto-Contouring System	1
8) Carbon Fiber Top	1
9) Injector Accessory	1

5. Remote Access Software (Citrix or equivalent)	1 Set
1) Co-current Remote Access Users	10
2) Subscription for 5 Years	1
6. Existing System Upgrade	1 Set
1) LINAC Version Upgrade (v3.0 to v4.1)	1
2) Dynamic Collimator and Integrated VMAT - IMRT License	1
3) Advanced kV Imaging Solutions Upgrade	1
7. 3rd party Accessories	
1) Patient & Machine Dosimetry System - SunNuclear	1 Set
(1) Dynamic Thorax Phantom A/S	1
(2) SunSCAN Halcyon Couch Plate	1
(3) Dosimetry Cable (30m)	2
(4) Accessory – MOSFET Dynamic Thorax Phantom Insert	1
(5) Accessory – Imaging Dynamic Thorax Phantom Insert	1
(6) Accessory – Single Film Dynamic Thorax Phantom Insert	1
2) AccuCheck System + QA Pro	1 Set
(1) Image Workstation (Intel i7-14700 / 16GB / 256GB SSD+2TB / GTX1660 / 27")	1
(2) AccuCheck Software (Monte Carlo / TPS Check / DoseCHECK / Transfer Check/ 2D-QA / Log-file / In Vivo / QA Pro)	1
3) mobile MOSFET Wireless Dose Verification System	1 Set
(1) mobile MOSFET Reader Module	1
(2) Standard MOSFET Dosimeter w/ reinforcement (10pck)	1
(3) mobileMOSFET Software	1
(4) Bluetooth Wireless Transceiver	1
(4) Carrying Case	1
4) Elements Radiosurgery Solutions	1 Set
(1) Elements SRS/SRT Planning Suite (Including Comprehensive SW Pkg)	1
5) Quality Assurance (QA) System	1 Set
(1) IBA FG65-G Chamber	1
(2) Razor Nano Chamber	1
(3) Thermometer	1
(4) Barometer	1
(5) Phantom Plater for Razor Naon Chamber	1
(6) Printer for IBA	1
6) Patient LockBar for LINAC	6 EA

7) Immobilization Set for Bore type LINAC	1 Set
(1) AIO Baseplate (Respiratory Belt 포함)	3
(2) Resppiratory Belt	4
(3) Leg Support Cushion	3
(3) Wing Board System	2
(4) Grip Ring (Average Size)	6
(5) Tungsten Eye Shield (CT-sim 용 Dummy 포함)	2
(5) Intrauterine tube 0mm	1
8. Full Site Solutions	1 Set
(1) CT-sim 및 기존 Tomo 철거 및 폐기 작업	1
(2) LINAC 치료실 및 조정실 조성 공사	1
(3) CT-sim 실 및 조정실 조성 공사	1
(4) 차폐 및 인허가 작업	1

D. Remarks :

1. Supplier or contractor should be responsible for installation of this equipment.
2. The warranty for the equipment is three years after inspection (including all components except those specified as consumables).
3. An annual inspection of all components must be conducted at least once a year until the equipment is decommissioned, and the results must be submitted in writing to the medical engineering team.
4. The warranty period for parts supplied for a fee after the warranty period ends will be one year.
5. Before the end of the warranty period, a full inspection of the equipment must be carried out, and any defective parts and components must be restored to normal condition. The battery must be replaced regardless of its condition.
6. Service passwords, hardware keys, and other encryption systems necessary for using and maintaining the equipment must be provided. If encryption systems cannot be provided, technical support must be offered free of charge at any time.
7. All service activities, including preventive maintenance, must be reported to the medical engineering team before work, and confirmation from the medical engineering team must be obtained after work. Any service that is not confirmed by the proper procedures will be considered invalid.
8. The service manual must include circuit diagrams and information necessary for post-maintenance. If not submitted, the warranty period will be extended by one year. (If the circuit diagram is not included, alternative A/S information recognized by the medical engineering team must be provided.)
9. This configuration includes all options available from the supplier. Any additional or confirmed options before delivery must be included in the final delivery.
10. Maintenance training must be provided to the medical engineering team personnel at the supplier's expense, covering the following: Theory + Practical Training (The training location and schedule will be mutually agreed upon.)
11. The supplier shall provide training necessary for the operation of the supplied equipment.
12. The supplier or contractor must upgrade the version of the existing TrueBeam (H196929) installed at Ewha Womens University Mokdong Hospital (v3.0 to v4.1, RapidArc Dynamic Treatment Delivery, HyperSight)